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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

KANG, DONGHEE

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 02/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/473,394

Applicant(s)

MISTRY, KAIZAD R.

Examiner

Donghee Kang

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 December 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 December 1999 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 16.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2 December 2002 has been entered.

Information Disclosure Statement

2. Acknowledgment is made of receipt of applicant's Information Disclosure Statement (PTO-1449) filed September 9, 2002.

Drawings

3. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

4. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Antecedent basis for the claimed subject matter in claims 1 & 4, lines 13-14, respectively is required, namely: the "**an outside surface of the recess**" which is not disclosed in the description section of the specification.

Claim Objections

5. Claims **2-3 & 5-9** are objected to because of the following informalities:

Regarding claim **2**, line 2: the phrase "the innermost portion of the source/drain extension" should be - -the innermost portion of the extension--.

Regarding claims **3, 6 & 9**, lines 1 & 2, respectively: the phrase "the recessed channel" should be - -a recessed channel- -.

Regarding to claims **5 & 8**, line 2, respectively: the phrase "an innermost portion of the source/drain extension" should be - -the innermost portion of the extension--.

Regarding claim **7**, line 12: the phrase "an inner-most portion" should be - -an innermost portion--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims **1-6** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding to claim **1**, line 13: the phrase "**an outside surface of the recess**" is unclear since it does not sufficiently describe the structural relationship as where the

outside surface of the recess is positioned (e.g., a bottom portion or a vertical sidewalls) in the device.

Regarding claim 4, lines 13-14: the phrase "***an outside surface of the recess***" is unclear it does not sufficiently describe the structural relationship as where the outside surface of the recess is positioned (e.g., a bottom portion or a tapered sidewalls) in the device.

The examiner interprets an outside surface of the recess as a bottom portion or sidewalls of the recess.

Claims 2-3 & 5-6 are rejected since each includes the limitations of the independent claims 1 & 4.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1-3, in so far as claims 1-3 are in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 102(e) as being anticipated by Chang et al. (US 6,303,448).

Regarding claim 1, Chang et al. disclose a field effect transistor, comprising (Fig.6):

a substrate (10) having a recess in a surface thereof; the recess having a bottom portion and substantially vertical sidewalls; a gate dielectric layer (62) disposed superjacent the bottom portion of the recess and adjacent the substantially vertical sidewalls; a gate electrode (64A) completely overlying the gate dielectric layer; and source/drain terminals (70) disposed in the substrate in alignment with a pair of laterally opposed gate electrode sidewalls, said gate electrode extending to a less shallow depth within said substrate than a depth at which the source/drain terminals are disposed; wherein the source/drain terminals comprises an extension (LDD,66) which extends to a more shallow depth within the substrate than the source/drain terminals to which it corresponds and extends downwardly, from approximately the surface of the substrate, along the sidewalls of the recess, an innermost side of the extension is adjacent to an outside surface (bottom portion or vertical sidewalls) of the recess, a portion of the gate dielectric layer overlying an innermost portion of the extension.

The word "adjacent" is a broad term, which means not distant or nearby (Merriam-Webster's Collegiate Dictionary). Figure 6 clearly shows that the innermost side of the extension is adjacent to the bottom portion and/or vertical sidewalls of the recess.

Regarding claim 2, Chang et al. disclose the transistor further comprising a portion of the gate electrode that overlies the innermost portion of the extension.

Regarding claim **3**, Chang et al. disclose that the gate electrode conforms to a recessed channel.

10. Claims **4-6**, in so far as claims 4-6 are in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 102(a) as being anticipated by Gardner et al. (US 5,918,134).

Regarding claim **4**, Gardner et al. disclose a field effect transistor, comprising (Fig.10):

a substrate (102) having a recess in a surface thereof; the recess having a bottom portion and tapered sidewalls, the tapered sidewall surface forming an obtuse angle with respect to the bottom portions of the recess; a gate dielectric layer (132) disposed superjacent the bottom portion of the recess and adjacent the tapered sidewalls; a gate electrode (134) completely overlying the gate dielectric layer; and source/drain terminals (140a) disposed in the substrate in alignment with a pair of laterally opposed gate electrode sidewalls; wherein the source/drain terminals comprises an extension (130) which extends to a more shallow depth within the substrate than the source/drain terminals to which it corresponds and extends downwardly, from approximately the surface of the substrate, along the sidewalls of the recess, an innermost side of the extension is adjacent to an outside surface (bottom portion or tapered sidewalls) of the recess, a portion of the gate dielectric layer overlying an innermost portion of the extension.

The word “adjacent” is a broad term, which means not distant or nearby (Merriam-Webster’s Collegiate Dictionary). Figure 10 clearly shows that the innermost

side of the extension is adjacent to the bottom portion and/or tapered sidewalls of the recess.

Regarding claim **5**, Gardner et al. disclose that a portion of the gate electrode overlies the innermost portion of extension.

Regarding claim **6**, Gardner et al. discloses that the gate electrode conforms to the recessed channel.

11. Claims **7-9** are rejected under 35 U.S.C. 102(b) as being anticipated by Ahn et al. (US 5,342,796).

Regarding claim **7**, Ahn et al. disclose a field effect transistor, comprising (Fig.9):
a substrate (1) having a recess in a surface thereof, the recess having a curvilinear shape; a gate dielectric layer (7) disposed superjacent the curvilinear recess; a gate electrode (9) completely overlying the gate dielectric layer (see Fig.7); and source/drain terminals (13) disposed in the substrate in alignment with a pair of laterally opposed gate electrode sidewalls, wherein the source/drain terminals comprises an extension (11) which extends to a more shallow depth within the substrate than the source/drain terminals to which it corresponds and extends downwardly, from approximately the surface of the substrate, along the curvilinear sides of the recess, a portion of the gate dielectric layer overlaying an innermost portion of the extension.

Regarding claim **8**, Ahn et al. disclose that a portion of the gate electrode overlies an innermost portion of the source/drain extension.

Regarding claim 9, Ahn et al. disclose that the gate electrode conforms to the recessed channel.

Response to Arguments

12. Applicant's arguments filed 21 October 2002 have been fully considered but they are not persuasive.

Applicant argues that Chang et al. do not teach an innermost side of the extension being adjacent to an outside of the recess. The word "adjacent" is a broad term, which means not distant or nearby (Merriam-Webster's Collegiate Dictionary). Figure 6 clearly shows that the innermost side of the extension is adjacent to the outside surface (bottom portion or vertical sidewalls) of the recess. The innermost side of the extension does not have to be in contact to the bottom portion or sidewalls. Therefore, the 102 (e) rejection anticipates each and every element as set forth in claim 1.

Applicant's arguments with respect to claims 4 & 7 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghee Kang whose telephone number is 703-305-9147. The examiner can normally be reached on Monday through Friday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers

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for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.


Donghee Kang
Patent Examiner

dhk
February 6, 2003